How We Got from There to Here and Back

Dr. Edward H. Angle dominated orthodontic armamentarium, diagnosis and treatment planning for almost a half century until Charles Tweed successfully challenged his mentor’s non-extraction mantra. The ensuing diagnostic regimen used by Tweed, however, proved to have serious limitations and clearly resulted in the extraction of too many teeth. This caused a subsequent deterioration of soft tissue appearances of patients that neither they nor their doctors liked. This article will describe and illustrate how new expansion techniques differ qualitatively from those of Angle, and how these techniques offer patients and doctors less invasive and more comfortable therapies which do not jeopardize facial appearances.

Introduction

For the first third of this past century, orthodontics found itself dominated by one man, Edward H. Angle, with the resultant intellectual stagnation that arises from such monomaniacal control. This recognition in no way detracts from Angle’s contributions – notably his clear and simple classification system along with the edgewise bracket. Both of these inventions have endured for a century, and that is no mean achievement in any scientific discipline. Nevertheless, orthodontists’ unquestioning acceptance of his limited diagnostic and treatment planning regimens hindered the advancement of this discipline more than it helped, and the last half of this past century was spent trying to overcome the stuper of the first half. Angle’s influence continued until an apostate student of his, Charles H. Tweed,1 had enough courage and objectivity to challenge Angle’s non-extraction scheme. It wasn’t a tremendous leap of intellectual power. Tweed simply and honestly recognized that when 100% of your patients relapsed, there might be something wrong with the diagnosis and/or treatment planning.

Dr. Tweed acted appropriately in the face of this challenge - quite unlike the ancient dentist who chided a young colleague who was describing his meticulous technique of endodontic filling to the monthly assembly of dentists. The old man explained his own technique that used a simple matchstick sharpener with a pocketknife and then jammed into the canal. When the young dentist asked if a lot of roots were filled, he never solved the problem of parallel roots to prevent the extraction space from opening. If he couldn’t do it, then, ergo, no one else could, and this resulted in a virulent opposition to any extractions and an insistence upon enlarging the arches to accommodate all of the teeth. This dogma stayed dominant for several decades until Tweed advocated the extraction of premolars based on his diagnostic triangle, which was the first systematic treatment planning strategem orthodontists had. Tweed received corroboration simultaneously from another former Angle protégé in Australia, Raymond Begg,2 who had developed the Begg boronigies and concluded that nature intended for enamel to wear. He decided that orthodontists could mimic nature by extracting teeth prior to orthodontic therapy. The Tweed and Begg Extraction Philosophies eventually prevailed and remained uncontested for some time. Several years past before Holdaway3,4 published his articles that suggested the soft tissue in the way of the determining feature of diagnosis. This disputed Tweed’s narrow diagnostic regimen that focused on the mandibular incisor and totally neglected the soft tissue. Tweed’s triangle set in motion a trend that emphasized more prudence in the extraction of teeth. Soon others added their discoveries regarding soft tissue and the maxillary incisors as main determinants of diagnosis and treatment planning.5

From the inception of this specialty, with Dr. Angle, diagnosis never had too much importance because everyone received the same nonextraction treatment with the same expansive appliance. The marvel of it all is that the collection of orthodontic records never became important. A few months ago an orthodontist boasted that since invoking a different treatment regimen, he was treating 98% of his patient’s nonextraction. One was tempted to ask if he still took records because with diagnostic certainty such as that, records are clearly redundant. Orthodontists shouldn’t waste patients’ time and money taking impressions, cephalometric X-rays or doing treatment simulations if all treatment plans are essentially the same. One doesn’t need orthodontic records to come to such a preconceived conclusion.

Obviously, this one-size-fits-all treatment planning didn’t benefit patients a hundred years ago, and it doesn’t in our own age. But such simplicity continues to hold enormous appeal for many orthodontists. Orthodontists pride themselves in being scientists, and without doubt they receive good training in the scientific method; but it takes very little anecdotal information to eclipse the scientific judgment of many in the profession. Albert Szent-Györgyi was probably more right than he knew when he said, “The brain is not an organ of thinking but an organ of survival like a claw and fang. It is made in such a way as to make us accept as truth that which is only advantage.”

No matter how spectacularly orthodontic therapy changes, it will benefit our patients minimally if we do not have a concomitant improvement in our diagnostic and prognostic knowledge. This remains the number one imperative for those who practice orthodontics. Orthodontists should view any new therapy unaccompanied by equally sophisticated diagnostic knowledge suspiciously. Patients have already received far too much orthodontic treatment and far too little diagnosis.

Instrumentation

The first attempts to correct malocclusions used simple large arch wires ligated to the malposed teeth. Pierre Fauchard of France developed the precursor of the modern appliance – expansion arch (Figure 2).  

When Angle launched the ribbon arch bracket, he had already started work on the edgewise bracket primarily as a supplement to his ribbon arch appliance. Nevertheless, the edgewise bracket did not suddenly spring full-grown from Angle’s fertile mind, but slowly evolved with several iterations (Figure 5). When Angle realized that this bracket could deliver three-dimensional control of the teeth with horizontal, one directional placement and simultaneous engagement of all the teeth, he changed the bracket several times until he achieved the #447 (Figure 6) in 1928. It received early and enthusiastic endorsement.
from dental clinicians throughout the United States and eventually eclipsed other useful orthodontic appliances such as the Mc Coy open tube appliance, the Atkinson universal appliance and the Johnson twin wire attachment.

The universal application and durability of the edgewise bracket confirmed Angle’s modest claim that it offered the “latest and best in orthodontic mechanisms.”1 In novators have added minor but practical trimmings such as rotating wings, twin brackets, different dimensions, preadjusted appliances, lingual applications, etc., but the essence has remained edgewise. For any instrument, particularly in the health sciences, to remain virtually unchanged (and almost as useful for close to a century) approaches unbelieveability. In the auto mobile industry, this would be equivalent to the Model T Ford remaining as the epitome of motoring sophistication.

Rather than adding wings and doubling the bracket to make the popular twin edgewise bracket, Angle’s invention has remained basically unchanged. Holdaway10 suggested angulations for brackets to help set anchorages, parallel roots and architecturally positioned teeth, while Lee11 had built some ante rior brackets with the ability to torque incisors. But it was Andrews that was to develop an appliance that would apply 1st, 2nd and 3rd order movements to the teeth without making changes in the wire – hence the Straight Wire Appliance.12

Preadjusted orthodontic appliances have dominated the profession for the past 30 years, and the belief in them shows little sign of abating even though many have questioned the one-size-fits-all idea.13–18

And Back Again

The publication of Frankel’s19 work with functional appliances illustrated significant enlargement of dental arches and reworked an interest in nonextraction therapy. Nevertheless, Frankel’s mechanical requirements for the use of removable appliances, and that didn’t resonate well with many orthodontists or their patients. After a brief flurry of interest in the United States, few clinicians continued to use the Frankel appliance on a regular basis.

Nevertheless, the successful use of orthopedic appliances alerted orthodontists to the possibility of increasing arch widths and arch perimeters with minimum force.

Although mandibular canines offer significant resistance to expansion, mandibular premolars and first molars often demonstrate substantial and stable expansion. Brader20 hinted at this with his work on the tri-focal ellipse arch form, but he didn’t follow through about how this might give wider and more accommodating arch forms.

Low-force titanium coil expanders have shown their ability to develop arches laterally,21 and recently Damon22 has suggested that low arch wire forces, coupled with a passive tube and a small wire-to-lumen ratio, enable teeth and their accompanying dentoalveoli to expand in all planes of space. Damon feels that using small, low-force wires such as those of Copper Ni-Ti23 (Ormco Corporation, Orange, CA) achieves the ideal biological forces proposed long ago by several investigators.24–26

Self-ligating brackets that essentially form a tube developed several decades ago with the Ormco Edgeld27 being the first, closely followed by the Speed bracket.28 Both of these early self-ligating systems suffered from the fact that the Straight-Wire Appliance phenomenon debuted at the approximately the same time, plus a lack of appreciation for what the newer titanium wires could achieve.

Damon has persisted since 1995 with his version of a self-ligating bracket (Figure 5) and has fundamentally changed the types of arch wires and the sequence in which clinicians use them. His experience has shown that with many patients he can often eliminate distalization of molars, extractions (excluding those needed to reduce bimaxillary protrusions) and rapid palatal expansion. He offers compelling clinical evidence of doing this with consistency.29

The Damon bracket is essentially a tube designed with the right dimensions to foster sliding mechanics where needed and enough play in the system for torque and rotational control using the larger cross section wires. Damon starts cases with a large lumen arch wire slot and .014 or smaller diameter bi-technology arch wires. Starting cases with a large dimension passive arch wire slot and small diameter wires diminishes the divergence of the angles of the slots. This lowers the applied force and binding friction. (figure 7)

The most logical questions readers could propose would be how has Damon shown successful expansion whereas Angle did not? The quantity of expansion probably differs little, but the quality of expansion offers a quantum change. Mollenbaur24 has suggested as much with his appeal for light forces. Even though Angle used a ribbed arch, (which suggests a thin, delicate wire) the actual size of the wire had the dimension of .036 x .022 inches. Ligating to this wire would overwhelm the periodontium and prevent the development of a supporting dentoalveolar. Rather than forming new bone, the supporting dentoalveolar would simply bend and upon completion of treatment quickly return. Astute clinicians often see this with molar distalization from headgear use and over treat such movement in order to compensate for this regressive bone bending.

Schwartz30 stated that it takes 20 to 26 g/cm² of force to collapse the capillaries in the Periodontal Ligament. With RPEs and headgear this force sometimes exceeds 10 pounds!31

Proffit32 states that the optimal force levels for orthodontic tooth movement should be just high enough to stimulate cellular activity without completely occluding blood vessels in the periodontal ligament.

True biomechanics is staying in the Optimal Force Zone i.e. keeping forces below capillary blood pressure. Conventional ties (o-rings and stainless steel ligatures and spring clips) make staying in the Optimal Force Zone nearly impossible due to the increased binding and friction.

The most important caveat Damon offers clinicians is not to use their ordinary mechanics with his system, and I could not agree more. When I first began to use the Damon system, I continued to use the regular sequence of arch wires and saw little change in the new, more expensive brackets. Nevertheless, as I began to use the brackets according to Dr. Damon’s advice, I started seeing phenomenal changes. The following patient illustrates typical responses to the biomechanics offered by the Damon System:

Summary

The paradigm shift in our current thought processes is the belief that alveolar bone can be altered and re-shaped with low clinical forces. Using low force, low friction orthodontics, the alveolar bone allows the bodily movement of teeth in all directions. The architecture of alveolar bone appears to improve over time following low force orthodontics so clinicians should be very creative on how to maintain the appropriate biologic forces during all phases of treatment.

Orthodontists are currently witnessing an interest in qualitatively different expansive biomechanics that offer patients the possibility of obviating the use of distalizers, rapid palatal expanders and many needless extractions. The bracket systems that make this possible should command the utmost respect and clinicians should use them as recommended with light forces.

I am witnessing shorter treatment in most of my Damon cases with less discomfort to my patients. The playing field seems to be leveled between adults and children. These changes I am seeing are more than enough reasons for me to question my previous treatment systems.

Reference is available upon request. Please contact deyanov@dental-tribune.com
The conference itself started on the 19 Feb, with the opening ceremony where Prof Suliman Alomaran, Head of SOS welcomed the distinguish guest, delegates, speaker and society members to this year’s meeting. He also summarized the achievements of the SOS Board through the last 3 years. This year is the last year of the board and handing over responsibility will be given to the newly elected board at the end of the meeting. The opening ceremony was followed by an important lecture titled “Critical evaluation in orthodontic appliance” by Prof W. Proffit where he gave a summary of his 50 years experience with fixed appliance and what are the changes that the orthodontists could expect in the coming years.

This was followed by an interesting lecture of “Overview of CLII treatment” which was given by Dr. Tamer Buyukylmaz where he presented the clinically proven technique for treating CLII cased backed by number of cases that he treated himself for ranging from children all the way to adulthood and which technique has shorter time than the other.

Since the temporary anchorage device is to get much attention these days, Prof W. Proffit later on the day presented a lecture on “TNC experience with screw and mini plate”, thus giving the pros and cons of them with keys of success illustrated by multiple cases showing perfect results and decreasing the need for surgical interventions with Orthodontic.

The first day was wrapped up by Dr. Robert Boyd lecturing on “Orthodontic and Esthetic Considerations in Planning and Placement of Restorative Implants” where he stressed on the more demanding of esthetics by patients since Orthodontic by itself could not fulfill all patient demands such as having a brighter and wider smile, he showed several cases with restorative treatment giving the final touches to a good Orthodontic treatment.

He also compared between cases treated by Orthodontics alone and one treated by multi approach of Ortho-Resto-Porio which really made a bigger difference in those patients smiles.

On the second day of the conference Prof William Clark is the inventor and developer of the famous twin block functional appliance which is the most used one to correct CLII skeletal discrepancy in growing individuals. In his lecture Prof Clark took the audience through the different steps of diagnosis and treatment utilizing twins blocks with minimal and/or no need for fixed appliance.

He stressed the importance of patient selection, motivation and instruction to the success of treatment with such devices. The audience interacted with this lecture since some of them had quite doubts about this method but Prof Clark explained to them the keys for success using this method.

Dr. Robert Boyd concluded the morning session with a talk on “How can aligners be used for complex Orthodontic cases” ranging from extraction cases to correcting of much hard vertical cases in adults with good prognosis and lasting stability.

The afternoon session was dedicated to future promising subjects in Orthodontics such as distraction cheliplasty where Dr. Abdullah Alfaidi spoke from his surgical background as a Craniofacial Surgeon how this minimal procedure could improve the smile dramatically without the need to more complex Orthognathic surgery involving cutting of bone or augmentation. The audience listened with attention on how to select cases for such a procedure and how the procedure is done in a very short time under one hour in some cases. Later that day Dr. Sarah Alfaqeh spoke on “Constraints on tooth growth by developing alveolar bone” where she pointed the causes of such problems, which used to be thought that the main cause behind it is primary teeth.

Then Dr. Hadwah Moawad took the stage to speak on “Genetic in Orthodontic” and how the advancement in this field could lead to prediction and reducing malocclusion.

The 2nd day of the conference concluded by a lecture Given by Prof Clark where he spoke on “New horizons in Orthodontic and Dentalfacial orthopedics”, he highlighted the latest development in Orthodontic thus his talk raised lots of questions from the audience about the technique presented and how to use them for the best benefit for the patient and practitioner. This led to the time scheduled for the lecture to extend to more than ½ hour then the scheduled time.

The conference was followed by a post conference with the title of “The Forces System: Advance in fixed appliance technique. New technique for lingual arch developing” where Prof Clark spoke for 6 hours over the whole day on his new invention Forces System which make correcting transverse problems and CLII easier through utilizing the ligual arch developing technique which gives faster and more repayable results as was explain by Prof Clark in comprising to fixed appliance places from the buccal side. Accompanying the 7th conference was an exhibition dedicated for Orthodontic products and new advancements in this field with over 14 local and international companies which captured the interest of all 500 participants who attended the conference. Overall the 7th Saudi Orthodontic conference was up to the level of expectation and gain satisfaction on venue, speakers, and overall organization which showed clearly from the feedback of the attendees. With warm smiles the participants said farewell to each other hoping to see one another around the same time next year at the 2014 annual meeting.

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Contact Information
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I am constantly striving to implement the critical initiatives required to meet and exceed my reader’s expectations. Having met with my burning desire to be influential in introducing scientific excellence embodied in a prominent professor who is creating a superior and influential leadership role in his interest. I have the honor to introduce with grace and respect Prof. Dr. Abbas Zaher, a celebrity who is acclaimed to worldwide attention.

I will definitely focus on my valuable interaction on the professional artist who with his tremendous knowledge and vast experience is well known for creating natural and flawless smiles on peoples faces before reshaping their dental flaws bringing the face into better proportion with his talented professional excellence that surpassing not just their teeth but their whole being. But I will also stress on his remarkable professional role as a notably respected professor in the Faculty of Dentistry – Alexandria University. I was blessed to be one of his students in Alexandria who learned from his endless priceless moral and professional lessons. Ongoing updates about new launches, his ethics in orthodontic principles of medical practice thus setting an unrepeatable example for orthodontic principles of medical practice.

The value of orthodontics and its welfare in the society thus setting an unrepeatable example for orthodontic principles of medical practice. It would be highly appreciated if you give me a piece of advice or a concrete case considering to shape his or her future with a career in orthodontics.

First do not consider malocclusions as the problem. Malocclusions happen to be attached to a person’s mouth. These persons are seeking your help to improve their smiles, looks and self-esteem. My first advice is hand excellence. The classifications are designed to facilitate communications with colleagues but are never the basis for your protocol of treatment. There are no two alike palates. Measurements and cephalometric analyses give you an idea about the extent and the trend of the problem. Do not attempt to treat patients to cephalometrics “norms” or averages. Tailor the treatment plan according to individual and consider the aid from other specialists as needed. Always relate your ideas to your patients before the start of the treatment and do not surprise them with the need for adjunctive procedures at the end of treatment.

You are a well-known entity in the orthodontic science, how much of you are there in this field?

My patients are occupying a large part of my professional life, after that, I can easily say that in the field of orthodontics I am divided between scientific research and teaching, and looking after the specialty welfare in Egypt and at the international level. I enjoy teaching to graduate students and conducting researches that attack clinical problems. In this respect, I also enjoy knowing the renowned international leaders and lecturing about evidence-based clinical knowledge.

In what way your fruitful knowledge and rich experience will assist you in handling your responsibilities in the Egyptian Orthodontic Society? It would be appreciated if you inform us on what your work revolves around in this organization.

Traveling around the world whether to attend conferences or to lecture gave me great opportunities to interact with colleagues from various backgrounds. Also participating in the organization of several international events which is helping put, the society at the international level. In addition, personally knowing the renowned international speakers facilitates the organization of scientific meetings for the society and inviting excellent speakers. I was elected to serve on the board of directors of the World Federation of Orthodontists for ten years and from 2010 to 2011 I served as Vice President of the WFO. During those years I gained invaluable experience in the governance of an international association, which also help in the organization of the specialty in our country. We are currently building the Egyptian Orthodontic Society and in order to empower it we need to upgrade the level of the service of Orthodontics for the Egyptian patients.

Would you talk to us about your experiences as being vice president of the World Federation of Orthodontics?

It was most enriching experience. Besides being involved in the governance of one of the largest specialty organizations, I had the privilege of being associated with a board of trustees made of a dedicated and talented group of individuals. Each and all of them had an impact on my professional development. It was an opportunity to join in the establishment of two very important contributions by the World Federation of Orthodontists: the international board of orthodontics and the guidelines for orthodontic education. In addition, I had the chance to meet with and learn from all my colleagues from almost every corner of the world. This also was an opportunity to extend help and assistance in the formation of first time specialty organization in many parts of the world. Now, I have traveled to all continents and a major part of the globe. I can say that I have developed friendships in almost every corner of the world. And that is the most benefit I received from my service on the WFO board for 10 years and I treasure it tremendously.

Please identify your goals and ambitions for the next 2 years and your plans to achieve them and cultivate your profound knowledge in implementing them.

My goals for the Egyptian Orthodontic Society include; establishing the already agreed upon Egyptian Board of Orthodontists, in addition, to devise an awareness plan for the general public about the benefits of orthodontic treatment and the treatment and training in order to become specialized in orthodontics. These two ambitious goals require the assistance of all our members and large amount of funds. There are conflicting studies that were rarely clear-cut, would you like to talk about any of them?

What contemporary scientific issue are you most concerned about now?

I am most concerned with scientific research that will directly apply to our clinical practice. Some of the interesting topics that I am interested in is the enamel conservation during and after orthodontic treatment. My studies include, prevention of dental calcification, treatment of early enamel decalcification, bacterial growth and control during treatment, enamel color change after treatment and what would influence it, 3D imaging and its application, orthognathic surgery and finally multidisciplinary treatment.

What is the most important part of the work you do that gives you the most satisfaction? Conversely what is the downside of your work?

I enjoy tremendously my clinical work. Dealing with patients and changing their lives is my passion. I am lucky to have my work as my hobby. Teaching is another passion of mine. It is a pleasure to interact with the residents, they are always anxious to learn and keep me motivated. On the other hand, I don’t like the administrative part of working at the faculty. I dislike reports and completing forms.

In what way is your strength lies?

My strength in orthodontics lies in being critical and observational. As I say in my lectures: “Orthodontics is the art of seeing”. I can see the problem then you can take it and treat it in order to achieve the end result. In addition, well, you have to listen (to your patients) well.

How long it takes to come to a statistically significant scientific conclusion that needs to be published and the benefit of being published?

Any study well designed and using the correct statistical tests can lead to scientific information that will benefit the readers and the practice of orthodontics.

How far being an eminent professor allows you to explore other interests in life like spending time with your family or working on hobbies?

My family is a priority. It was hard to find the time for my kids when they were younger and when I was busy in studying and in practicing the development of my career. I always kept hobbies such as reading, travelling and hunting. As I have interests to improve my own lecture for my hobby. I enjoy lecturing and travelling and will seize every opportunity to visit new places and get to know its people.

If you were to define orthodontics, how would you complete this sentence: “Orthodontics is the science that allow the practitioner to discover and make use of their profession in order to be	

If you were to define orthodontics, how would you complete this sentence: “Orthodontics is the science that allow the practitioner to improve his/her self-esteem as well as the function, health and longevity of the dentition.”

Every person faces profitable productive moments. Would you like to talk to us about the most rewarding incident you had and the greatest achievement you have reached.

I am proud of my achievement as professor; it was a long and strenuous path. One of the most rewarding moments was when I finished my PhD, at that day I earned the title “Doctor” which is my favorite designation.

Conclusion:

With objective assurance and consulting activities, he definitely added value to the title “Professor” which is interchangeable with the name of Dr. Abbas Zaher who is considered an eminent Orthodontist in Alexandria in particular and worldwide in general.

I am always trying to approach my mission from the broadest perspective by consistently exceeding expectations and setting standards for excellence in proving services for my readers. I favor introducing celebrities and ideas with a global or regional impact fueled by people committed to delivering exceptional results and creating extraordinary brands. I will try to maintain tightly focused on continuously adding value by providing objective and innovative ideas. All of our strategies and actions will be molded by a set of core values that are shared by each and every associate. Perfection and capturing our reader’s attention has always been our desired destination in this section.